

DEPARTMENT OF TRANSPORTATION
DIVISION OF TRAFFIC OPERATIONS
1120 N STREET, MS 36
P. O. BOX 942873
SACRAMENTO, CA 94273-0001
PHONE (916) 654-4551
FAX (916) 653-6080
TTY (916) 653-4086



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Be energy efficient!*

July 13, 2005

Ms. Regina McElroy, Director
Office of Transportation Operations
U.S. Department of Transportation
Federal Highway Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Dear Ms. McElroy:

The California Department of Transportation (Caltrans) requests permission to place tsunami signing in California under interim approval. The enclosed report provides details and pertinent information regarding the proposed tsunami signs.

The basis of this request for interim approval is experience in the United States, Puerto Rico and other countries. This experience and enclosed report satisfy the intent and requirements of Section 1A.10 of the 2003 Manual on Uniform Traffic Control Devices (MUTCD) regarding interim approval to place a traffic control device.

The State of Oregon adopted four basic designs for tsunami signs that it helped develop under the auspices of the National Tsunami Hazard Mitigation Program, which was a federally sponsored and funded project. Caltrans is proposing to adopt three of Oregon's signs and modify one other. Essentially, Caltrans is proposing to use the same design for TSUNAMI EVACUATION ROUTE and TSUNAMI HAZARD ZONE signs currently used in the States of Alaska, Oregon, and Washington. In addition, Chile, Puerto Rico, and Thailand use the same type of signs.

Over one thousand of these signs have been installed worldwide with success and public acclamation. These signs have been in use since 1996 in Chile and since 1997 in the United States, and recently Thailand has begun installing these signs. The signs are not in the 2003 MUTCD. To maintain uniformity and public familiarity on the Continental Pacific Coast, Caltrans prefers to use the same signs as its neighboring States. The public has become accustomed to the familiar tsunami wave-symbol used on the signs.

California is introducing a modification to Oregon's ENTERING/LEAVING TSUNAMI HAZARD ZONE sign to make it consistent with the TSUNAMI EVACUATION ROUTE sign for public recognition. Oregon has agreed conceptually with this modification. In addition, the

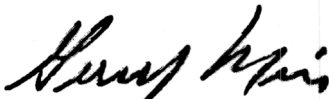
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California version of the TSUNAMI EVACUATION ROUTE sign will have a square-shaped background and black border like the federal EVACUATION ROUTE (EM-1) sign. Oregon also intends to change to the square-shaped background for this sign.

I would appreciate expeditious approval of this request. Because of the recent event in the Indian Ocean and an earthquake off the coast near Crescent City, California, there is a sense of urgency to place signs along the California coast.

If you need additional information, please contact me by telephone at (916) 654-4551 or by email at < gerry_meis@dot.ca.gov >.

Sincerely,



GERRY MEIS
Chief
Office of Signs, Markings and Permits

Enclosure

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bcc: Kris Balaji
Asif Haq
Greg Edwards
Nancy Dean – NOAA < Nancy.Dean@noaa.gov >
Matt Schmitz – FHWA < matthew.schmitz@fhwa.dot.gov >
Greg Stellmach < Gregory.F.Stellmach@state.or.us >

Request for Interim Approval Tsunami Signs in California

A. Problem Statement

The National Oceanic and Atmospheric Administration (NOAA) has asked the California Department of Transportation (Caltrans) to adopt tsunami signs like those signs currently used in Alaska, Oregon, and Washington. Caltrans has not adopted these tsunami signs for California. These signs are not contained in the federal 2003 Manual on Uniform Traffic Control Devices (MUTCD).

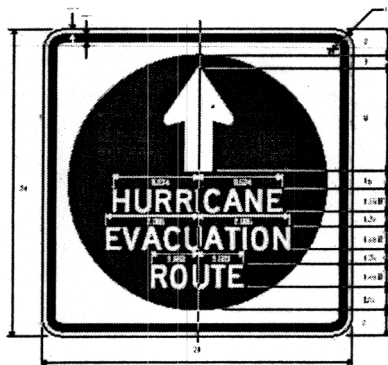
The Pacific coastline of the United States has a geological history of catastrophic tsunamis. The frequency of seismic-activity along the California coast, coupled with the recent Indian Ocean tsunami disaster, has elevated the need for tsunami signs in California. Except the Crescent City area in northern California, there are no signs along the California coast. During the past century, the waters off the Alaskan coast generated four large tsunamis. In 1964, one of them devastated the small northern California community of Crescent City and caused damage as far south as Long Beach Harbor. Caltrans wants to do everything possible in the interest of public safety, including installation of signs in an expeditious manner and adopting signs which local agencies may use.

An estimated 489 coastal communities within the Pacific Northwest States of Alaska, California, Hawaii, Oregon, and Washington are susceptible to tsunamis; as many as 900,000 residents of these communities are in tsunami-inundation areas.

B. Description of Proposed Change

1. The current standard for tsunami evacuation route signing is the federal EVACUATION ROUTE (EM-1) sign shown below. It is found in Figure 2I-1 "Emergency Management Signs" of the 2003 MUTCD. However, there is very little support for using this sign along the California coast for various reasons discussed in the ensuing report.

Federal EM-1 Evacuation Route Sign



COLORS: LEGEND - WHITE (ARROWS, LETTERS);
BACKGROUND - BLACK (REVERSE SIDE)

2. Instead of the federal EVACUATION ROUTE (EM-1) sign, Caltrans is requesting interim approval to use proposed new signs (shown below) in tsunami-inundation areas along the coast of California. There is strong support for these signs.

California Proposed Tsunami Signs



Caltrans has made minor modifications to Oregon traffic sign specifications to develop the above signs. Signs will be available in various sizes appropriate for the roadway type. Attached are California traffic sign specifications for these tsunami signs. Blue color and font will be in accordance with standards set forth in the 2003 MUTCD. Essentially, these signs are consistent with the tsunami signs now used in Alaska, Oregon, and Washington, Chile, Puerto Rico, and Thailand.

A
Local emergency-management officials will designate routes and locations for placement of the TSUNAMI EVACUATION ROUTE sign. Alaska, Oregon and Washington use this sign. Other than the wave-symbol, it is consistent with the federal EVACUATION ROUTE (EM-1) sign.

B
Local emergency-management officials will designate appropriate locations for placement of the TSUNAMI HAZARD ZONE / IN CASE OF EARTHQUAKE, GO TO HIGHER GROUND OR INLAND sign. Generally, these locations will be low-speed streets near the coast, parking lots, parks and beaches. Caltrans does not plan to use this sign on high-speed facilities or along an evacuation route. Alaska, Oregon, Washington, Chile, Puerto Rico, and Thailand use this sign.

C
The ENTERING / LEAVING TSUNAMI HAZARD ZONE sign will delineate the boundary of potential inundation areas on State highways, and local streets and roads. This is a modification of the Oregon sign. The modification is necessary to make the sign consistent with the TSUNAMI EVACUATION ROUTE sign for public recognition. Oregon has agreed conceptually with this modification.

D
Local emergency-management officials will designate sites and locations for placement of the EVACUATION SITE sign, which directs road users and pedestrians to a safe area. Oregon uses this sign. Alaska uses a similar sign.

3. The status and history of tsunami signs along the Pacific Coast of the United States and Internationally are as follows:

Alaska



The State of Alaska uses three basic designs to mark tsunami evacuation routes and hazard zones. Alaska began installing signs in 1999. State transportation officials developed the signs through a state/federal partnership (called the Tsunami Steering Group) to standardize the design and format throughout Alaska, Washington, Oregon, California, and Hawaii. The Tsunami Steering Group, which adopted the signs, is a collaboration of these States by their Emergency Management personnel under the guidance of NOAA, to ensure enhanced recognition by tourists as well as by local residents.

Many Alaskan coastal communities are at substantial risk from locally generated tsunamis. About one-half of Alaska's 33,904 miles of shoreline is vulnerable to tsunamis. Alaska has 74 tsunami-threatened communities. Currently only the communities of Sitka, Sand Point, Seward, Homer, Kodiak, and Valdez have tsunami signs. Sign placement is coordinated between local agencies and State transportation officials. To date, Alaskan communities have placed approximately 545 signs. State transportation officials have received numerous positive comments from people living in these communities supporting the effort.



Damage from the 1964 tsunami in Kodiak, Alaska.
Credit: NOAA

California



Tsunami evacuation route sign in Crescent City, California. Credit: FEMA

California has installed a few signs in the Crescent City area of northern California like the Oregon sign. Caltrans is not aware of any other tsunami signs in California. Other than the federal EVACUATION ROUTE (EM-1) sign, California has not officially adopted the sign depicted in the above photograph.

Hawaii

The State of Hawaii does not post tsunami signs, except in Hawaii County. Hawaii County posted some “Evacuation Route” signs many years ago before formation of the Tsunami Steering Group. Caltrans has learned that there are no other tsunami-related signs in Hawaii. Generally, this is because of opposition from the hotel industry. In Hawaii, the front of telephone books shows tsunami evacuation maps and emergency information.

Oregon



Oregon signs are actually white on blue, although depicted as white on black above (as copied from Oregon sign specifications).

In 1994, a working-group (made up from participants from the Oregon Department of Geology and Mineral Industries, Department of Transportation, Land Conservation and Development, Parks and Recreation, and Oregon State University Extension Sea Grant) searched for an international warning symbol for tsunamis. When the working-group could not find an acceptable symbol, it asked Oregon State University Extension and Experiment Station Communications artist Tom Weeks for help. The working-group gave Mr. Weeks some ideas, and he created the familiar wave-design for the bright blue tsunami signs now used worldwide.

At a March 4, 1997, meeting in Seattle, the Tsunami Steering Group voted to adopt the Oregon wave-symbol signs for California, Oregon, Washington, Alaska, and Hawaii. Anyone visiting the beaches in any of those states (except California) sees the same sign/symbol warning them of tsunami hazard. Oregon installed decals with the hazard zone warning and wave-symbol on 200 All-Hazard-Warning signs at Oregon coastal state parks.

Oregon has not studied the effectiveness of the tsunami sign. State officials noted that the approved sign design was a multi-federal/state agency effort. Oregon is proposing to modify the current design to change it from a circular sign to a circle on a square background. This is because Section 2I.03 of the 2003 MUTCD requires the evacuation route sign to be a rectangular sign.

Oregon has installed an estimated 200 to 300 signs to date. Oregon provides grants to cities and counties for tsunami signing. Local agencies have installed a number of signs over the years because of this program. Oregon posts tsunami information signs at beaches using the same wave-symbol as the road signs. The intent is that the drivers will connect the design on the information at the beaches with the signs on the road.

Washington



The State of Washington uses two types of signs to mark tsunami evacuation routes. Washington first began installing tsunami signs in September 1997. There are about 100 signs on the Washington State highway system and approximately an equal number of signs on local streets and roads. Thieves frequently steal tsunami signs. According to officials, they have replaced nearly every tsunami sign at least once due to theft.

International Tsunami Signs



The *International Coordination Group for the Tsunami Warning System in the Pacific* submitted the above designs for tsunami signs to the International Standards Organization (ISO) in late 2004. To date, the ISO has not made a ruling on acceptance of the designs.

According to its web-site(<http://ioc3.unesco.org/itic/contents.php?id=71>): “The International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) was formed in 1968. The main purpose of the group is to assure that tsunami watches, warning and advisory bulletins are disseminated throughout the Pacific to member states in accordance with procedures outlined in the Communication Plan for the Tsunami Warning System. The ICG/ITSU is a

subsidiary body of the United Nations Educational, Scientific, and Cultural Organization, Intergovernmental Oceanographic Commission (UNESCO/IOC). Its purpose is to recommend and coordinate programs most beneficial to countries belonging to the IOC, whose coastal areas are threatened by tsunamis.”

Chile



Tsunami inundation area signs at Chinchorro Beach, Arica

The port-city of Arica in Chile began installing the U.S. version of tsunami signs in 1996.

Puerto Rico



Puerto Rico posts TSUNAMI HAZARD ZONE signs in many coastal communities similar to those used in the United States.

Thailand

Thailand began installing TSUNAMI HAZARD ZONE signs like Oregon’s along beaches in May 2005 as part of Thailand's new National Disaster Warning Center.

C. Location Where Signs Will Be Used

NOAA is funding and leading the march for much of the tsunami mitigation efforts in California. Part of this effort is tsunami-inundation area mapping. NOAA has mapped most of the California coast, including densely populated areas. With most hazard areas defined, communities are ready to establish evacuation routes and mark locations for installation of signs

D. Patents and Copyrights

There are no public or private patents or copyrights on proposed new tsunami signs with the wave-symbol. All of the proposed signs are in the public domain due to the efforts of the federally sponsored and funded Tsunami Steering Group. The State of Oregon developed the original wave-symbol design adopted by the Tsunami Steering Group.

E. Research and Evaluation

Section 1A.10 of the 2003 MUTCD states, "Interim approval is considered based on the results of successful experimentation, results of analytical or laboratory studies, and/or review of non-U.S. experience with a traffic control device or application."

In the spirit of Section 1A.10 of the 2003 MUTCD, Caltrans is requesting interim approval for its proposed tsunami signs on basis of experience in Alaska, Oregon, Washington, Chile, Puerto Rico, and Thailand. Over the past eight years, Alaska, Oregon, and Washington installed nearly 1,000 of these tsunami signs. During those years, the tsunami signs gained substantial popularity among local communities. The public understands the intent and meaning of these blue signs with the wave-symbol. In this light, Caltrans does not think experimentation is necessary since signs have been in use for many years and the public is familiar with the tsunami wave-symbol. It is unlikely that experimentation would produce anything meaningful at this time.

Caltrans thinks it is prudent and expedient for California to begin installing the proposed new signs in order to promote consistency and uniformity along the Continental West Coast of the United States. The proposed signs will heighten public awareness about inundation areas and what action to take in case of a tsunami warning.

International proposals are not consistent with the standards set forth in the 2003 MUTCD for size, shape and color. In addition, the proposed international signs are not consistent with signs currently used in the Pacific Northwest of the United States, Chile, Puerto Rico, and Thailand. For these reasons, Caltrans prefers to follow the design adopted by the Tsunami Steering Group.

Furthermore, the National Tsunami Hazard Mitigation Program sponsored the Tsunami Steering Group as part of a multi-federal/state mitigation project. The U.S. Department of Commerce and NOAA provided funding for the project. Participant members are:

*National Oceanic and Atmospheric Administration (NOAA)
U.S. Geological Survey (USGS)
Federal Emergency Management Agency (FEMA)
National Science Foundation (NSF)
State of Alaska
State of California
State of Hawaii
State of Oregon
State of Washington*

Caltrans has not identified any studies to evaluate the effectiveness of tsunami signs or the wave-symbol, other than informal media attention and public comments, which have been positive and

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favorable towards the signs. For these reasons, Caltrans is requesting interim approval and requests that the proposed new tsunami signs be included in future rulemaking-action to amend the MUTCD.

F. Restoration

Caltrans will remove or replace signs if a safety or operational issue develops. Caltrans thinks this is unlikely because there have not been any safety or operational issues raised in over seven-years of prior use in neighboring States, Puerto Rico and other countries.

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*See EM-1A Grid (CA) for symbol design.

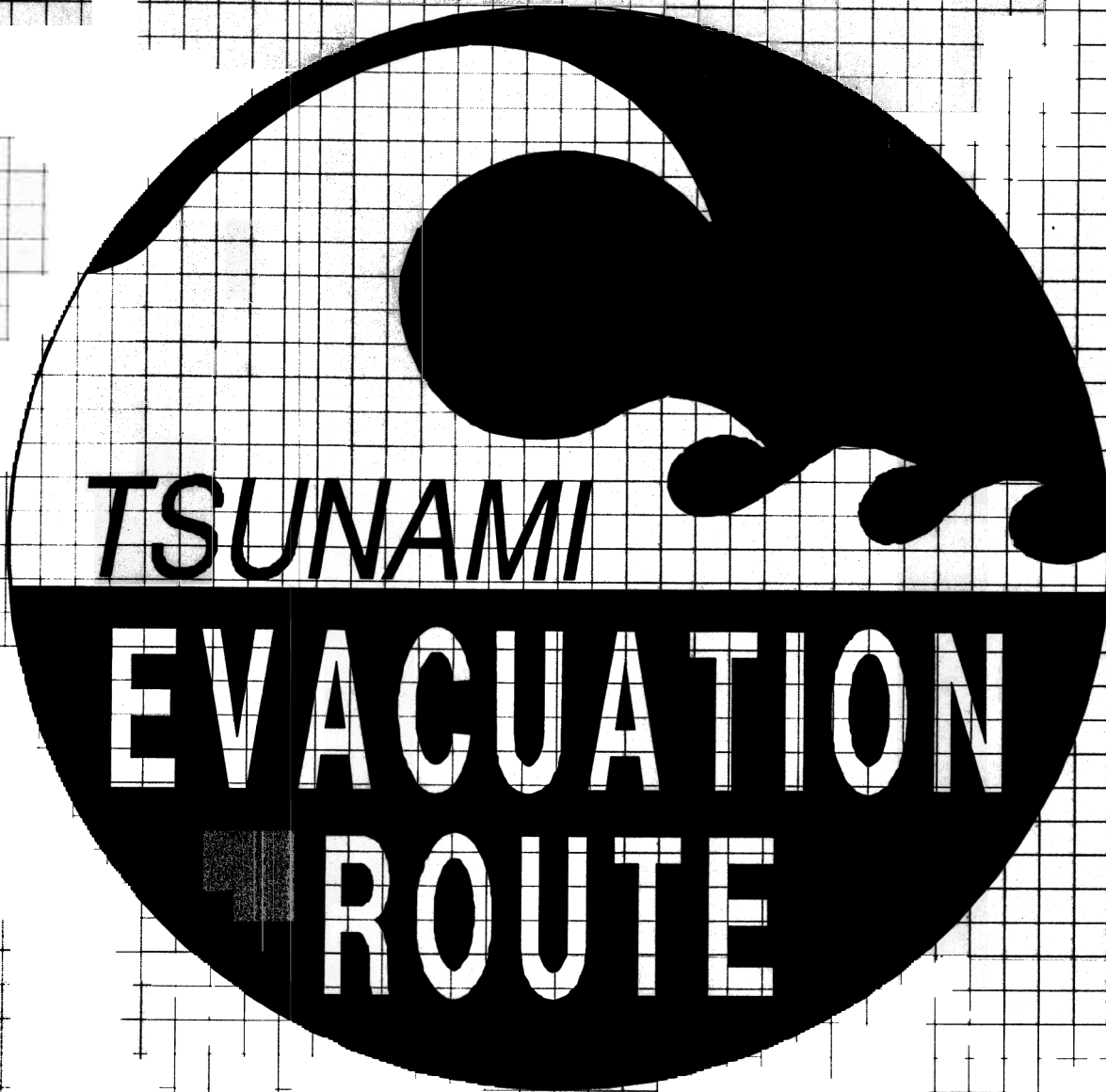
EM-1A (CA)

ENGLISH UNITS

A	B	C	D	E
12	.375	.375	1.5	8
18	.375	.5	1.5	14
24	.375	.625	1.5	20

COLORS: BORDER - BLACK (NON-REFLECTIVE)
BACKGROUND - WHITE (RETROREFLECTIVE)
SYMBOL DESIGN - BLUE AND WHITE (RETROREFLECTIVE)

DRAFT - JULY 2005



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*See EM-1B Grid (CA) for symbol design.

EM-1B (CA)

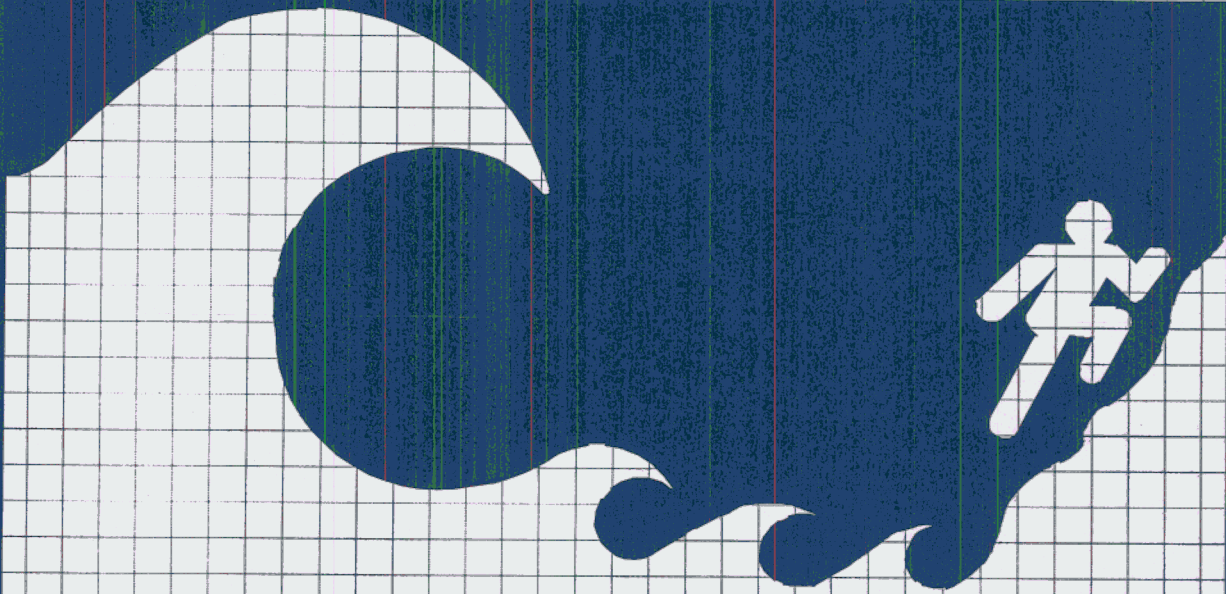
ENGLISH UNITS

A	B	C	D	E
15	12	.375	1.5	11.25
22.5	18	.375	1.5	17.25
30	24	.5	1.875	23

**COLORS: BACKGROUND - WHITE (RETROREFLECTIVE)
SYMBOL DESIGN - BLUE AND WHITE (RETROREFLECTIVE)**

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TSUNAMI HAZARD ZONE



IN CASE OF EARTHQUAKE, GO
TO HIGH GROUND OR INLAND

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*Alternate Message: LEAVING
 **See EM-1C Grid (CA) for symbol design

EM-1C (CA)

ENGLISH UNITS

A	B	C	D	E	F	G	H
12	15	.375	.375	1.5	1.25	2C	8
18	24	.375	.5	1.5	1.75	3C	14
24	30	.375	.625	1.5	1.5	3.5C	20

COLORS: BORDER - BLACK (NON-REFLECTIVE)
 LEGEND - BLUE (RETROREFLECTIVE)
 BACKGROUND - WHITE (RETROREFLECTIVE)
 SYMBOL DESIGN - BLUE AND WHITE (RETROREFLECTIVE)



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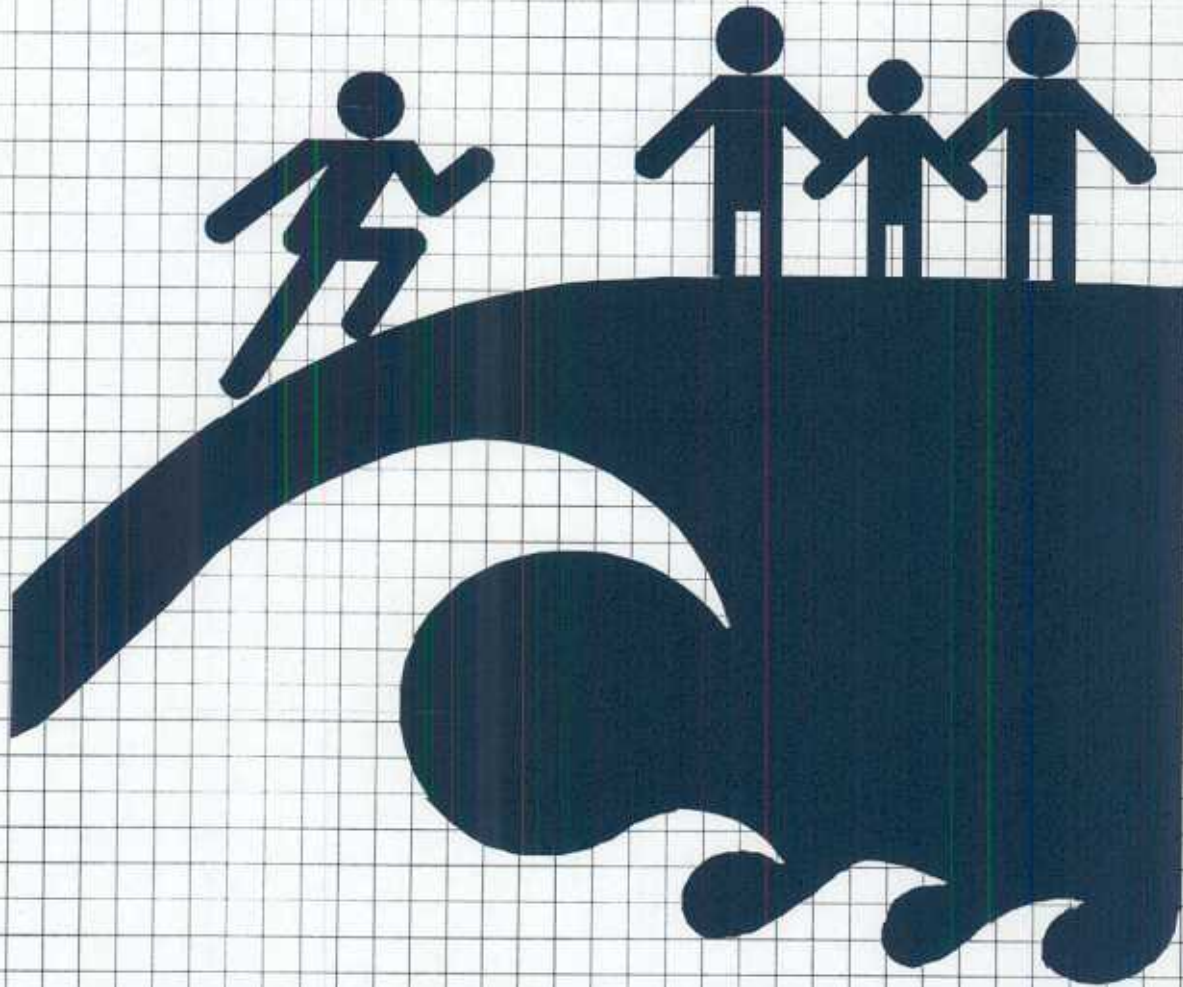
*See EM-1D Grid (CA) for symbol design.
Center symbol on sign vertically.

EM-1D (CA)

ENGLISH UNITS

A	B	C	D	E	F
12	15	.375	.375	1.5	10.5
18	22.5	.375	.5	1.5	16.25
24	30	.375	.625	1.5	22

COLORS: BORDER - BLUE (RETROREFLECTIVE)
BACKGROUND - WHITE (RETROREFLECTIVE)
SYMBOL DESIGN - BLUE AND WHITE (RETROREFLECTIVE)



EVACUATION SITE

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